USDA NRCS
Natural Resources Conservation Service

Erosion Control On Forest Land

Alabama Guide Sheet No. AL 655

Definition

Erosion on forest land occurs primarily on roads, log landings, skid trails, firebreaks, and areas that are mechanically site prepared. Erosion is controlled by minimizing soil disturbance and by applying erosion control practices.

Areas Where Erosion Occurs

Roads

Roads should be properly planned and located. Roads should generally follow the contour where possible. Grades should be kept below 10 percent where practical. Grades of 15 to 20 percent may occur for short distances (200 to 300 feet).

Skid Trails and Landings

Skid trails should not run straight up and down the slope but along a gradual angle across the slope to reduce the velocity of runoff water. The grade of skid trails should not exceed 15 percent except for short sections (300 feet or less) where the grade may be up to 20 percent. Landings should preferably be located on sites with good drainage and slopes of 2 to 5 percent.

Firebreaks

Firebreaks should be constructed on grades preferably 15 percent or less. Grades of 15 to 20 percent may occur for short distances (up to 300 feet).

Mechanically Site Prepared Areas

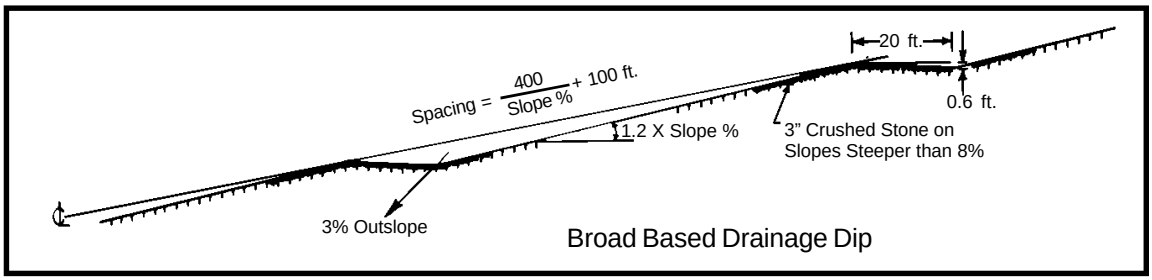
Mechanical site preparation should be excluded from soils with slopes exceeding 25 percent. Disking should be limited to soils with slopes of 10 percent or less and should be done on the contour.

Erosion Control Measures

Broad Based Drainage Dips

This type of erosion control should be used on permanent roads for removing runoff where water crosses the road. Broad based dips are an effective way of gathering surface water and routing it safely off the road. However, this method should not be used on roads with grades greater than 10 percent. To ensure the proper installation of drainage dips, have a trained individual design them.

% Slope	Distance Between Dips
1%	500’
2%	300’
3 %	235’
5 %	180’
10 %	140’
15 %	125’

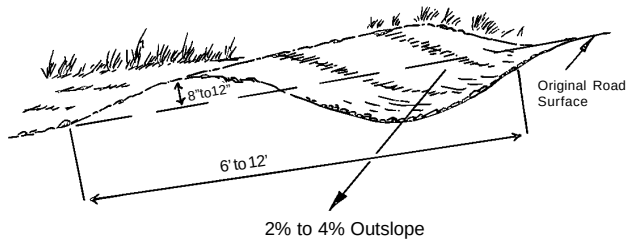


Broad Based Drainage Dip

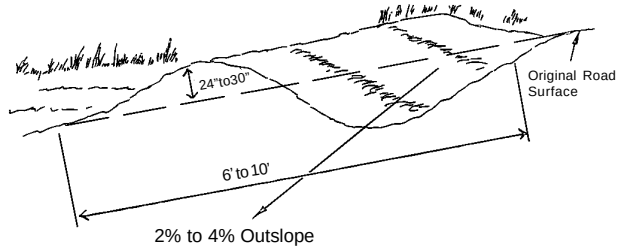
Water Breaks

Water breaks or water bars should be installed on sloping roads, skid trails, and firebreaks where there is a severe erosion hazard after logging is complete. The structures may be both shallow and deep. Deep breaks are usually on roads that will not have vehicular traffic.

% Slope	Distance Between Breaks
1%	400’
2%	245’
3%	200’
5%	135’
10%	80’
15%	60’
20%	45’
30%	35’
40%	30’



Shallow Water Break



Deep Water Break

Pipe Culverts

Pipe culverts are applicable on permanent roads where vehicular traffic will be relatively heavy after logging. Pipe culverts should cross the road on a positive grade in line with the drainage pattern. If erosion is a problem on the inlet end, a headwall must be provided. A 12-inch pipe is the smallest that should be used. The following sizes are best estimates for normal rainfall but may not handle the largest storm events.

Recommended Diameters for Culverts				
Drain Area (Ac.)	Lower Coastal Plain	Upper Coastal Plain	Piedmont	Mountains
10	12”	12”	12”	18”
50	30”	18”	30”	36”
100	48”	30”	42”	48”
200	60”	42”	54”	Two 48”

Turnout Ditches

Turnout ditches should be installed to disperse water collected in roadside ditches away from the road base into surrounding vegetation.

% Slope	Distance Between Turnouts
1%	500’
2%	300’
3 %	235’
5 %	180’
10 %	140’
15 %	125’

Bridges

Bridges should be used at crossings which are too large for culverts. Crossings should be at right angles to the stream. Approaches to bridges should be reasonably level for a distance of about 50 feet. If possible, alternate road locations should be used to avoid constructing bridges. Bridges create the least disruption to stream flow. Banks and fill material must be stabilized and protected from erosion. Spans must be installed to permit passage of all expected high flow. Portable bridges may be used and often reduce effort and expense in the long run.

Vegetation

Establishment

Roads, skid trails, log landings, firebreaks, and other disturbed areas should be vegetated as soon as possible. When selecting the plant species, establishment method, and maintenance procedure, be sure to take into consideration the climate, soil type, slope, and aspect of the site. Once you have selected a species to plant you must prepare the site, lime, fertilize, seed, and sometimes mulch.

Seedbed preparation is a very important step in vegetating a site. Disk harrowing and dragging will

firm and smooth the soil and promote good germination. Disking or ripping may be necessary in heavily compacted areas.

In order to determine the fertility and pH of the soil, a soil test should be performed. Lime and fertilizer work best when incorporated into the soil. Liming is absolutely necessary for maximum fertilizer utilization and proper plant growth.

Seeding can be done in a variety of ways. Using a farm tractor and a broadcast seeder is the most common method. Other methods include a shoulder-strap cyclone-type seeder and a hydroseeder.

Mulching helps to prevent erosion and allows vegetation to become established. Mulch is recommended on sites with slopes of 5 percent or greater and where vegetation is slow to establish. Straw or hay should be spread evenly so that there is 65 to 75 percent ground cover.

Vegetation enhances wildlife by providing nutritious forages and cover. Certain plant species attract wildlife and can help increase wildlife populations. For more information on vegetation. Contact your local NRCS office for a copy of "Erosion Control & Wildlife Plantings for Forestry Operations."

Maintenance

Maintenance is often required once the vegetation is established. This includes mowing, fertilizing, and liming. Mowing helps eliminate competition from weeds and woody vegetation. Fertilizing and liming on a regular basis maintain soil fertility and prevent soil acidity problems. Soil testing should be used to determine the amount of fertilizer and lime to apply. Soil test information can be obtained from your local County Extension Office. Vehicle Traffic should be limited during wet weather, especially on newly seeded roads.

References

USDA-NRCS Conservation Standard Code 560 – Access Road. September 1989.

USDA-NRCS Conservation Standard Code 655 – Forest Harvest Trails and Landings. January 1999.

Erosion Control & Wildlife Plantings for Forestry Operations. March 1997.

Alabama's Best Management Practices for Forestry. Alabama Forestry Commission. January 1993.

Woodlands of the Northeast. USDA-NRCS and Forest Service. 1977.